

CLAIMS

1. A machine structural steel product provided with superior formability of rotary-forming, quenching-crack resistance, and torsional properties, comprising: on a mass percent basis,

C: 0.35% to 0.50%;

Si: 0.15% or less;

Mn: 0.20% to 1.1%;

P: 0.02% or less;

S: 0.005% to 0.035%;

Cr: more than 0.1% to 0.2%;

Mo: 0.05% to 0.5%;

Ti: 0.01% to 0.05%;

Al: 0.01% to 0.05%;

N: 0.01% or less;

B: 0.0005% to 0.0050%;

Cu: 0.06% to 0.25%; and

Ni: 0.05% to 0.2%,

wherein an LD value represented by the following equation (1) of 120 or less is satisfied, and the balance of the composition includes Fe and inevitable impurities:

note

$$LD=0.569 \times \{7.98 \times (C) \}^{1/2} \times (1+4.1Mn) \cdot (1+2.83P) \cdot (1-0.62S) \cdot (1+0.64Si) \cdot (1+2.33Cr) \cdot (1+0.52Ni) \cdot (1+3.14Mo) \cdot (1+0.27Cu) \cdot (1+1.5(0.9-C)) \} + 52.6 \quad \dots (1),$$

where C, Mn, P, S, Si, Cr, Ni, Mo, and Cu in the equation each indicate the content (mass percent) of the respective elements.

2. The machine structural steel product having superior formability of rotary-forming, quenching-crack resistance, and torsional properties, according to Claim 1, further comprising: on a mass percent basis,

V: 0.01% to 0.30%, and

Nb; 0.005% to 0.05%.

3. A drive shaft comprising the machine structural steel product according to Claim 1 or 2, wherein a hardened layer is provided thereon by performing induction hardening and tempering.